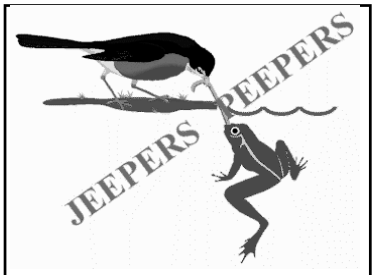
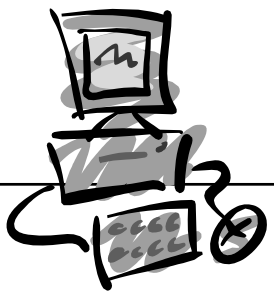
Is Spring Coming Earlier Each Year?

A data analysis activity using ice out dates



Swimming, boating, and fishing attract people from all over the northeast to Maine lakes during the summer. In winter Maine lakes offer skating, snowmobiling and ice fishing until late winter when the ice starts to melt. In olden days, people used lakes instead of roads and often floated logs to mills when there was no ice. The day when all the ice disappeared is called "ice out". These people who used the lake for work started keeping track of "ice out" as early as the 1880s.

Today, scientists continue to record the date of "ice out" using Julian days. Instead of using months they just number the days starting with January 1 as day one. February 1 would be day 32 and March 1 would be… well that depends if it is a leap year. The U.S. Geologic Survey (USGS) has compiled ice out dates for 29 lakes in New England in a report available on the web. (See Step 1)



The following ecological research activity makes a great classroom project throughout the year. There is even an assessment rubric aligned with the Maine Learning Results. Please go to ***www.mainedep.com*** and click on Jeepers Peepers to check it out!

Essay Question

Is spring coming earlier each year? Using USGS data from Maine Lakes provided on the Maine DEP web site, your task is to answer this essay question in 500 words or less; be sure to include your ideas along with supporting evidence (details) from the data and graphs. Use the following four steps to guide your analysis and report format when writing your essay.

Step #1: Go to web site ***www.mainedep.com*** and select the spreadsheet entitled: "ice out data" (Excel or Apple). Select <u>two or more</u> lakes and create an *XY scatter graph* for each. Put *"year"* on the X axis and *"ice out date"* data on the Y axis. Add a trend line or trend line equation to the graph.* Use the trend line equation to determine if ice out dates have changed over time. Describe how "ice out dates" have changed over time in each of the lakes you selected.

Ice out on Sebago Lake, spring 1985 (USGS)

** To create a trend line or equation: In Excel, right click on one point data on the graph and select add a linear trend line. In Appleworks, see other instructions for trend line equations.*

Step #2: Using the data, "Average Spring Temperature", create an XY scatter graph and trend line for the weather station that is closest to your lakes' locations. Again "year" should be on the X axis and "temperature (average March to May)" should be on the Y axis. Describe how the temperature trend has changed over time.

Step #3: Compare and contrast similarities and differences between the ice out data and air temperatures. Do you think this data shows a trend that may serve as an indicator of earlier springs overall? Explain your thinking: describe at least <u>three</u> observations or inferences about the data.

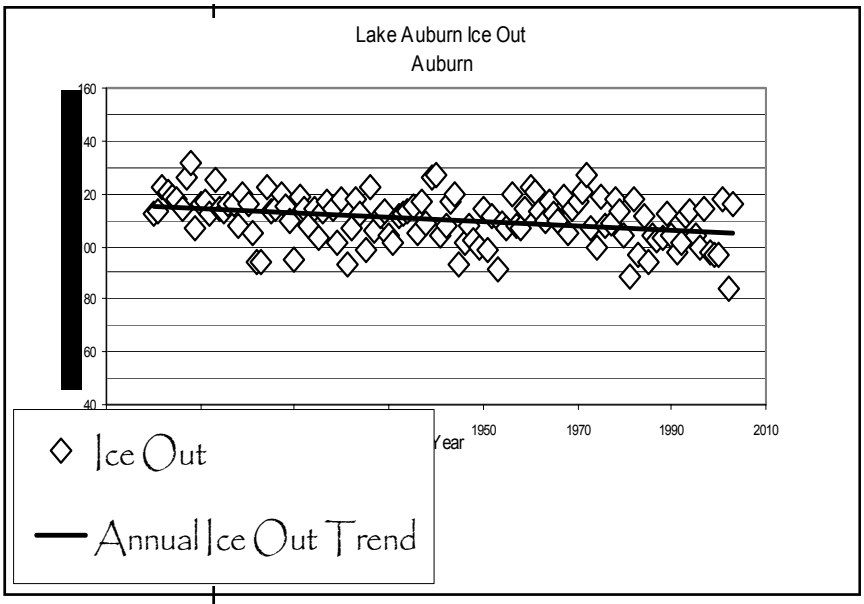
Step #4: What other indicators might help you to answer the question: Is spring coming earlier each year? Describe at least <u>two</u> and explain your thinking. If you were a scientist continuing to investigate climate change, what additional research questions would you explore? Describe at least <u>one</u> new question for research.

Report Format

Use the following sample format to write your essay (500 words or less). Be sure to address the questions posed in 1-4 and provide supporting details for your ideas and inferences.

- **Introduction -**
  Briefly, what is this essay/report about?
- **Body -**
  -Describe your findings, graphs, and observations. (Steps 1-3)
  -What are some indicators of spring you would be interested in studying further?
  -What additional research could you do to investigate climate change further? (Step 4)
- **Conclusion -**
  Summarize your findings and observations.

Sample Graph of Ice Out Data



Detailed directions to create graphs in Excel or Appleworks can be found on the Jeepers Peepers Essay Contest web page: @ ***www.mainedep.com***

Here are more great strategies to introduce climate change topics in your classroom

Jeepers Peepers 2005!

Join other classes in Maine by tracking the arrival of spring in the sixth year of **Jeepers Peepers Springwatch project**! Watch for the return of spring peepers, dandelions, robins, and maple budburst. Go to ***www.mainedep.com*** and click on Jeepers Peepers for more information or to register your class to track spring!

You can borrow a Climate Change Back Pack and schedule an introductory classroom presentation today…

The Climate Change Back Pack is full of curriculum ideas, games, and activities for use in the classroom. Upon request, we can even come into your classroom to do a few activities to help teach your students about this important topic. Coupled with the climate time machine activity (below), these activities make a great climate change session. Contact Jeremy Dubois at (207) 287-4855 or Peter Zack at (207) 625-7833 to borrow a backpack or schedule a visit!

The Climate Time Machine Biomonitoring Activity

How do scientists study climate change? In this activity, students jump on the climate time machine and with a hands-on experience, simulate an actual climate change study (using pollen) to track how the climate has changed over the past 20,000 years. Call Jeremy Dubois at (207) 287-4855 to schedule a presentation.